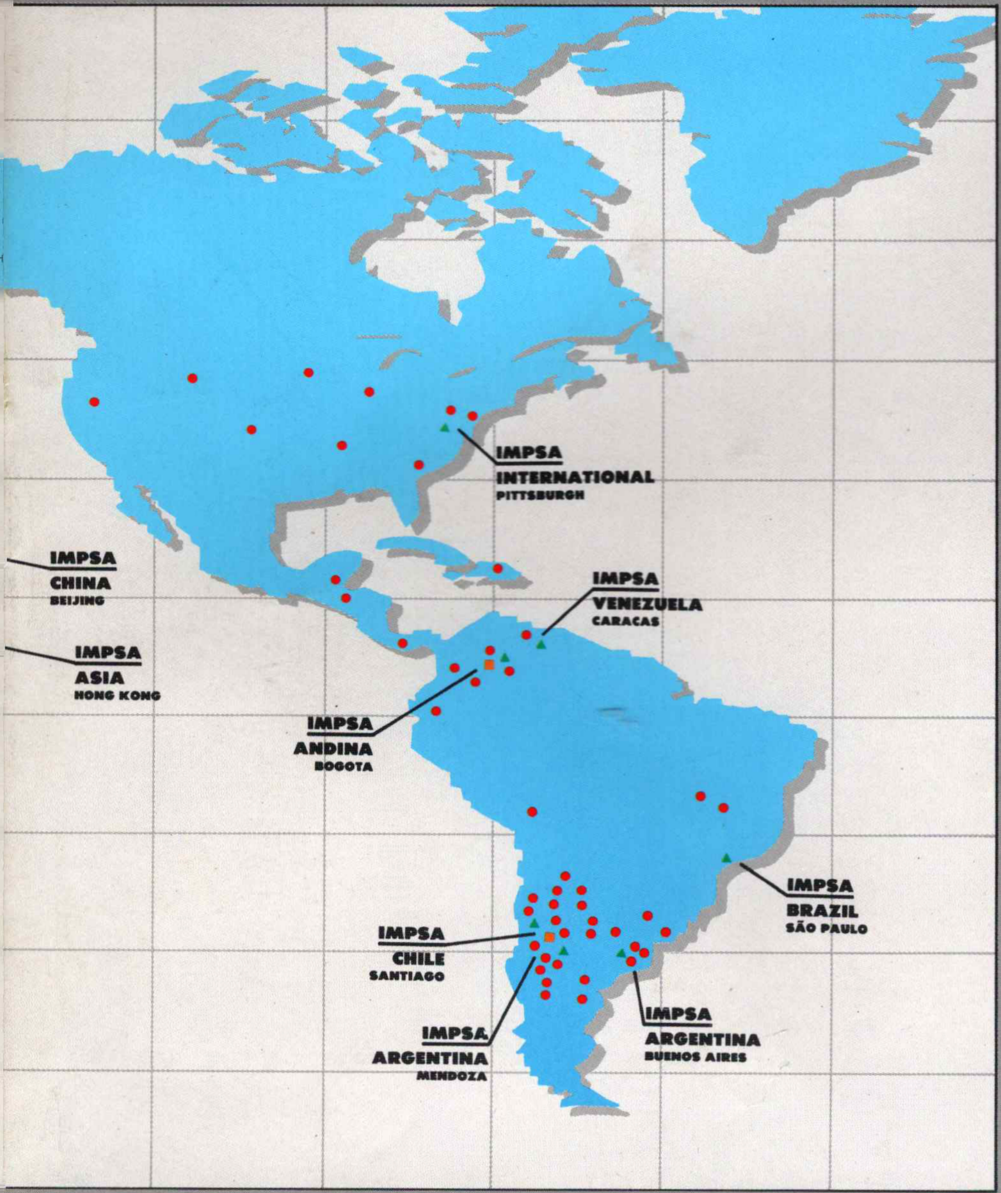
IMPSA

HYDROPOWER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INTERNATIONAL
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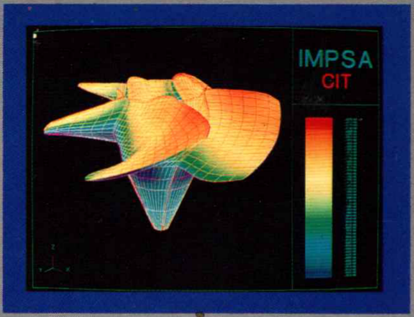
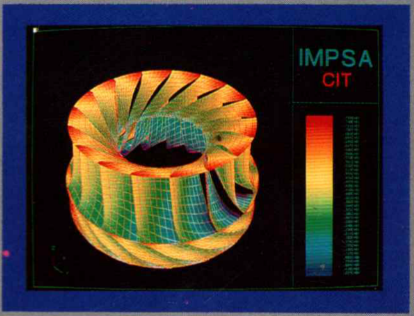
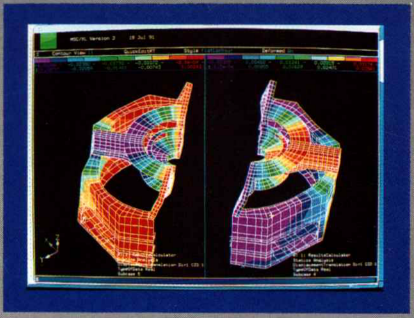
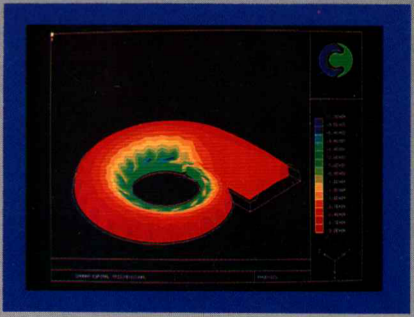
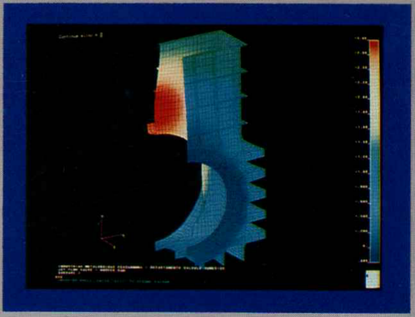








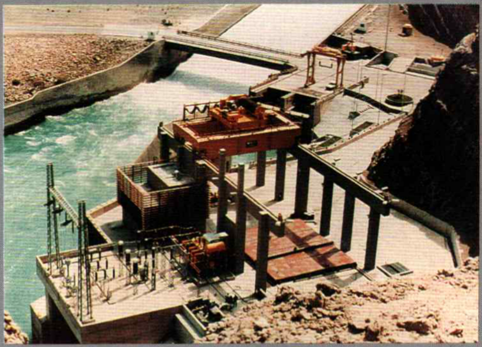


ARGENTINE WORLDWIDE TECHNOLOGY

IMPSA

ARGENTINE WORLDWIDE TECHNOLOGY

Cavern Power House, El Tigre Turnkey Hydropower Station, Argentina.


Quebrada de Ullum Turnkey Hydropower Station, San Juan, Argentina.

IMPSA

IMPSA is an Argentine based international conglomerate engaged in the supply, engineering and manufacture of high technology capital goods and infrastructural projects. Founded in 1907, IMPSA has accumulated state-of-the-art technology, expertise and experience worldwide.

IMPSA WORLDWIDE NETWORK

IMPSA has a strong network of manufacturing facilities, regional offices and area after-sales teams to provide efficient services for our customers around the world.

Its network spreads from its headquarters in Argentina to Brazil, Colombia, Chile, Costa Rica, Ecuador, U.S.A., Switzerland, Hong Kong, China, Malaysia, Indonesia, Philippines, Thailand and Middle East.

MODERN PLANTS AND EQUIPMENT

IMPSA has its own resources and manufacturing facilities in Argentina, Colombia and Malaysia, and maintains an international link of associated technical partners and manufacturing facilities in different countries.

In Argentina, well equipped with sophisticated machinery and facilities, IMPSA's 40,000 m^2 main plant is entirely dedicated to the design and production of capital goods.

IMPSA'S HYDROPOWER TECHNOLOGY

IMPSA has international experience in:

- Turnkey hydropower projects
- Hydraulic turbines
- Hydrogenerators
- Hydromechanical equipment
- Hoists and cranes

Supplying hydroelectric equipment since 1942, IMPSA brings proven experience to both domestic and international hydroelectric projects.

TURNKEY HYDROPOWER PROJECTS

IMPSA has a strong background in complete hydropower station supply. Total package including civil works, hydromechanical equipment, turbines, generators, power transformers, cranes, anxiliary equipment, switchgears, switchyards and control system can be available from one single source.

TURBINES

IMPSA is one of the few companies in the world which has specialized technology for Kaplan, Francis and Pelton turbines, as well as the capability to design and manufacture complete hydraulic machines.

GENERATORS

IMPSA possesses the capability in calculation, design, manufacture, quality control, erection, start up and commissioning of large salient-pole synchronous machines of a wide range of powers and speeds for different applications.

HYDROMECHANICAL EQUIPMENT

From its own facilities, IMPSA provides all the mechanical equipment required to support a power station. Penstocks, tunnel lining, bifurcations and distributors; radial, wheel and slide gates; fixed cone to butterfly and globe valves; trashracks, rack cleaners, hoists, powerhourse cranes and electrohydraulic actuators can be supplied to complete the water-to-wire capability.

HYDRAULIC RESEARCH LABORATORY

IMPSA has its own hydraulic research laboratory with dedicated staff, advanced equipment and universal test stands for the research and design of hydraulic equipment.

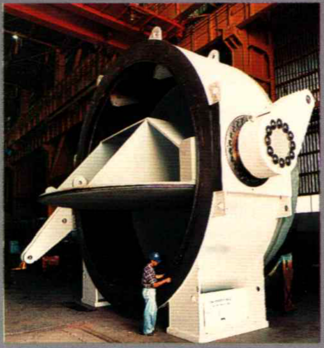
Aerial view of IMPSA's main manufacturing plant, Argentina.

Shop assembly, Jaguas Hydropower Station, Colombia.

Kaplan turbine, KAW Hydroelectric Project, U.S.A.

Radial gate, Agoyan Hydropower Station, Ecuador.

Lowering of complete rotor, Piedra del Aguila Hydropower Station, Argentina.



Shop assembly of butterfly valve, Kaw Dam, U.S.A.

GENERATOR FACTORY

To ensure manufacturing quality of IMPSA's products, IMPSA has a special purpose generator plant dedicated to the manufacture of complete generators as well as stator core elements, rotor rim segments, rotor coils, magnetic poles and stator windings.

ENGINEERING KNOW-HOW

Through research and development in system design and analysis, international technological exchanges, internal training programs and extensive worldwide experience, IMPSA has developed its own state-of-the-art technology in the hydroelectric specialty with a team of capable hydropower specialists and engineers.

ADVANCED COMPUTER APPLICATIONS

Hydraulic modelling, electromagnetic and electrical studies, mechanical analysis, fracture mechanics and structural analysis are carried out by means of sophisticated computer programs with extended use of finite element tools. Besides, IMPSA optimizes its production through the application of CAE/CAD/CAM softwares.

TOTAL QUALITY MANAGEMENT

A total quality management concept is applied to IMPSA's Quality Assurance Program at all production phases, from design to commissioning of products, insuring rigorous compliance with ISO 9001 and the strictest specifications and standards.

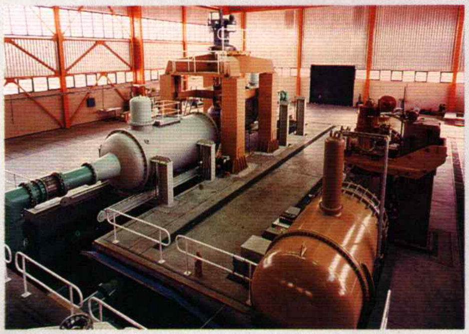
IMPSA is acknowledged by several prestigious international associations including ASME, API, Det Norske Veritas and Lloyd's Register.

RELIABILITY

A combination of design techniques, modern facilities, skilled specialists and the total quality system results in one key word for IMPSA's products: reliability.

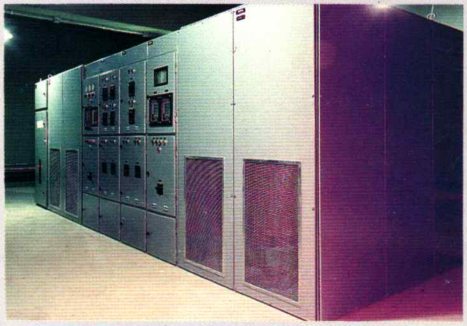
AFTER-SALES SERVICE

One of the major focal point of IMPSA's worldwide development has been its comprehensive after-sales services. Regional service teams can be available for technical assistance and support, repair and maintenance at our customer's disposal whenever and wherever necessary.

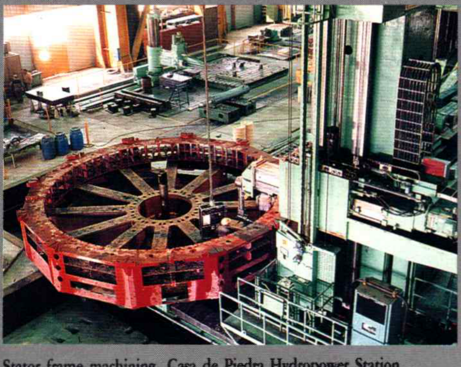


Test stand of hydraulic turbine models, IMPSA's Hydraulic Research Laboratory, Argentina.

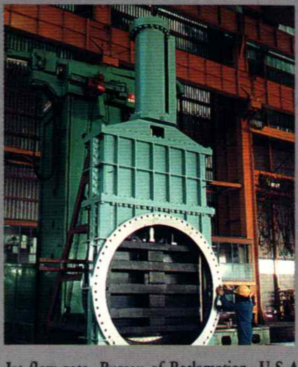
Sophisticated equipment and facilities dedicated for capital goods manufacturing, IMPSA Argentina.



Switchgears and electrical controls, designed and tailor-made by ICSA, an affiliate of IMPSA.



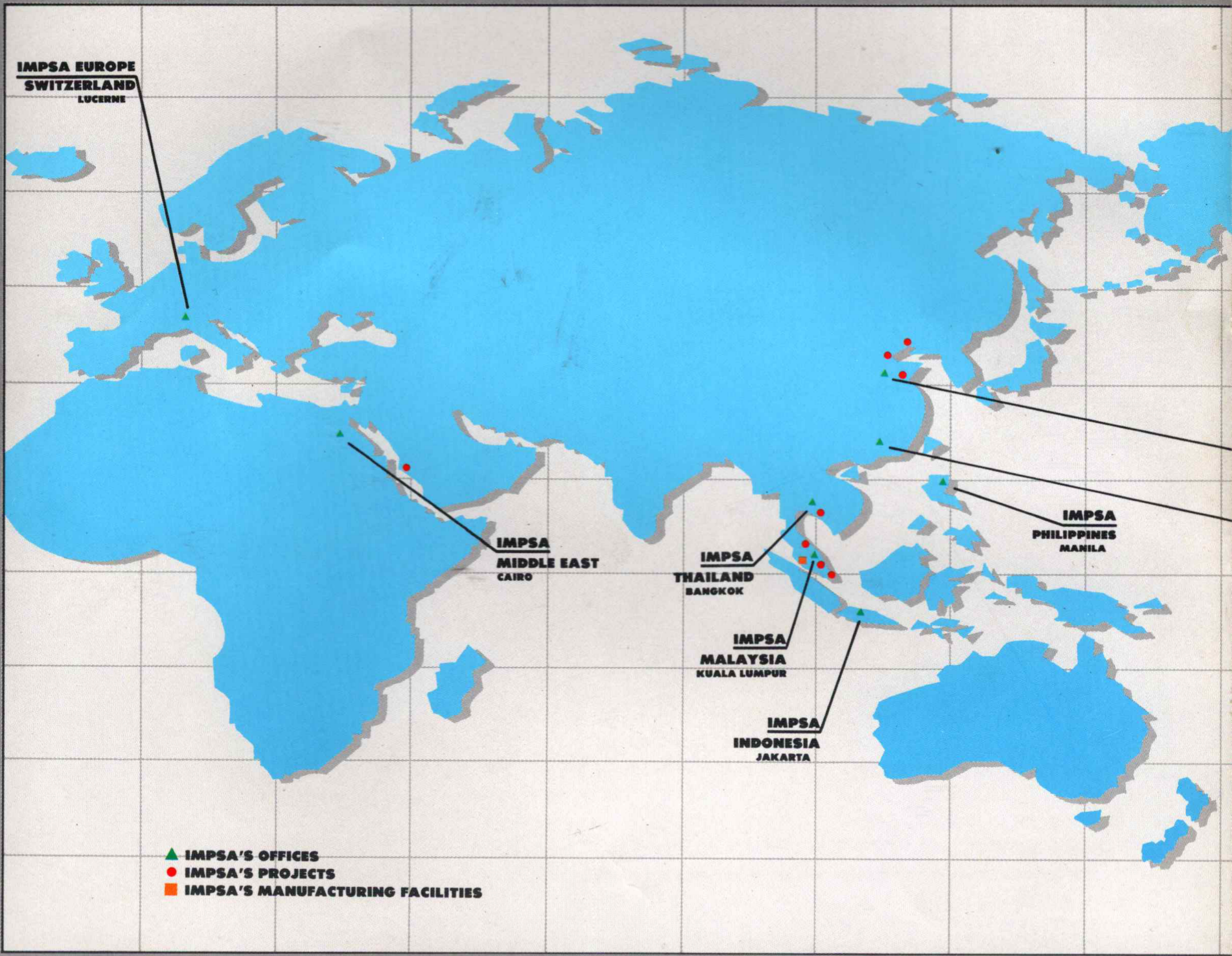
Stator frame machining, Casa de Piedra Hydropower Station, Argentina.



Jet flow gate, Bureau of Reclamation, U.S.A.

HUGAL AG, IMPSA's associated company in Europe, has the specialized knowhow in Pelton turbine.

IMPSA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▲ IMPSA'S OFFICES
● IMPSA'S PROJECTS
■ IMPSA'S MANUFACTURING FACILITIES

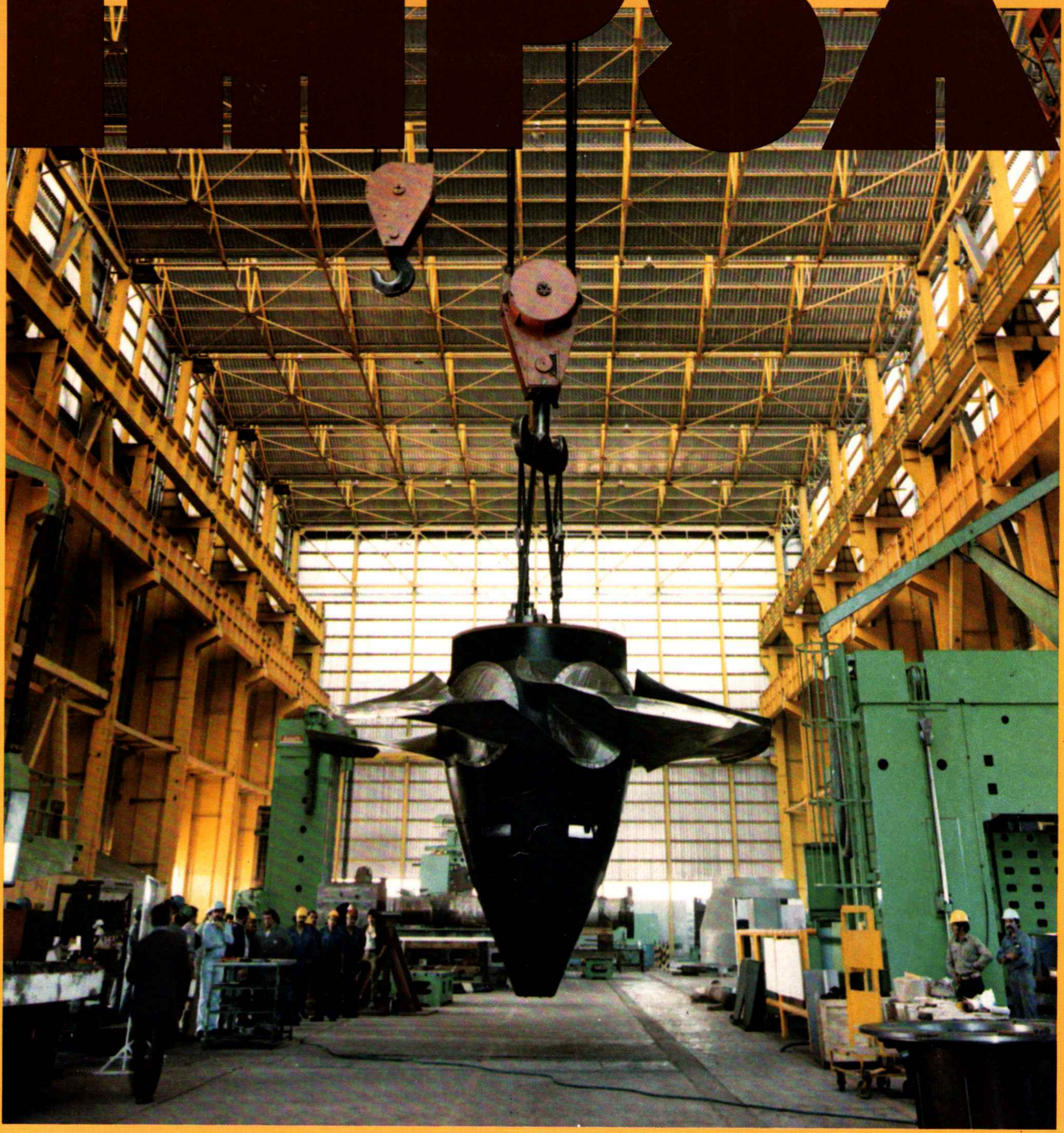
IMPSA WORLDWIDE NETWORK

IMPSA ARGENTINA Mendoza Plant: Carril Rodriguez Peña 2451, 5503 Godoy Cruz, Mendoza, Argentina. Tel: (54) 61-316127 Fax: (54) 61-316124 Telex: 55108 AR
Buenos Aires Office: Av. Eduardo Madero 940/41, Piso 19, (1001) Cap. Fed., Buenos Aires, Argentina. Tel: (54) 1-3152400 Fax: (54) 1-3152388 Telex: 17971 AR
IMPSA INTERNATIONAL Manor Oak II, Suite 536, 1910 Cochran Road, Pittsburgh, PA 15220, U.S.A. Tel: (1) 412-3447003 Fax: (1) 412-3447009
IMPSA ANDINA Carrera 15, No. 98-26, Piso 4, Bogota, Colombia. Tel: (57) 1-6105788 Fax: (57) 1-2269524
IMPSA BRAZIL Rua Florida, 1821, 3 Andar, Sao Paulo, Brazil. Tel: (55) 11-5424255 Fax: (55) 11-5435463
IMPSA CHILE Avenida Eliodoro Yanez 1750, Providencia, Santiago, Chile. Tel: (56) 2-2747820 Fax: (56) 2-2096901
IMPSA COSTA RICA Costado Oeste de Pops Sabana Sur, Edificio El Conquistador, Piso 4°, San José, Costa Rica. Tel: (506) 883372 Fax: (506) 317795
IMPSA ECUADOR Avda. América 4569 y Mañosca, Quito, Ecuador. Tel: (593) 2-458226/441125 Fax: (593) 2-440132
IMPSA ASIA Suite 501, Two Exchange Square, 8 Connaught Place, Central, Hong Kong. Tel: (852)-28104266 Fax: (852)-28100562
IMPSA ASIA, CHINA Suite 1106, Liang Ma Tower, 8 North Dongsanhuan Road, Chaoyang District, Beijing 100004, China. Tel: (86) 1-5012111 Fax: (86) 1-5012120
IMPSA ASIA, MALAYSIA Suite 11.6, 11/F, Menara Aik Hua, Changkat Raja Chulan, 50200 Kuala Lumpur, Malaysia. Tel: (60) 3-2386794 Fax: (60) 3-2386796
IMPSA ASIA, INDONESIA Jl. Terusan Hanglekir II - Kav. 501, Simpruk, Jakarta, Indonesia. Tel: (62) 21-7392536 Fax: (62) 21-7392536
IMPSA ASIA, PHILIPPINES The Olympia, Suite A61, 7912 Makati Avenue, Manila, Philippines. Tel: (63) 973-780909 Fax: (63) 2-8188254
IMPSA MIDDLE EAST 6, Salah El-Din St., Suite No. 12, Ground Floor, Zamalek, Cairo, Egypt. Tel: (20) 2-3407176 Fax: (20) 2-3414528
IMPSA EUROPE Tribschenstrasse 7, CH-6005 Lucerne, Switzerland. Tel: (41) 41-440364 Fax: (41) 41-443103

INDUSTRIAS METALURGICAS PESCARMONA SAICF

HYDRAULIC TURBINES
DIVISION

IMPSA



HYDRAULIC TURBINES DIVISION

—Hydraulic Turbines
—Mini-Turbines
—Large Pumps

PRODUCT CAPABILITY

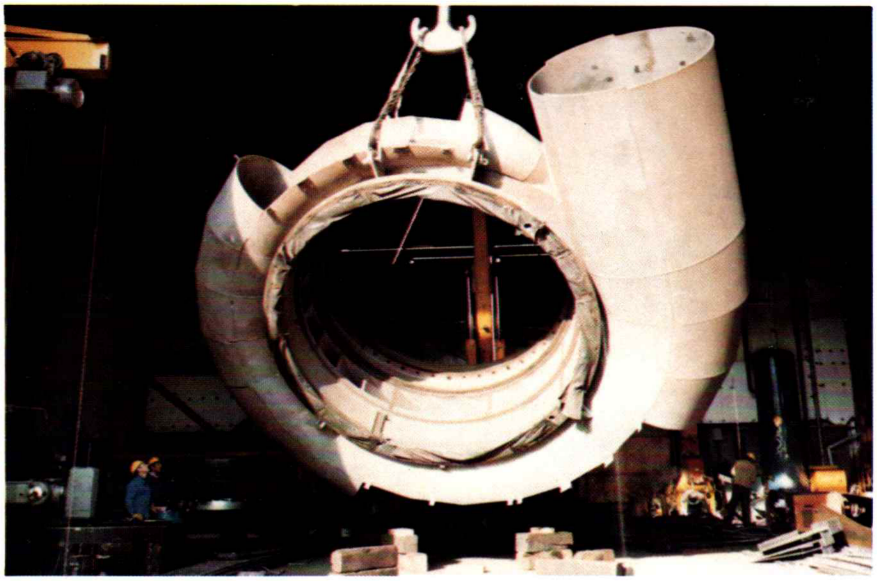
IMPSA has earned a solid international reputation as one of the few companies in the world to manufacture complete hydraulic machines.

During the last decade IMPSA has made great progress by acquiring modern technology and applying it to numerous projects.

The research and development of new manufacturing techniques have made IMPSA one of the leading companies in the field of cladding by means of welded bands, a process used in the lower and upper wicket gate rings and the wicket gate closure seats.

Due to the great manufacturing flexibility of its plants, IMPSA has extended its experience to the manufacture of mini-turbines.

As a member of the METANAC corsortium, and in association with Allis Chalmers and Dominion, IMPSA will be in charge of the design, manufacturing, assembly and start-up of seven of the twenty Kaplan turbines (138 MW and 9.5 m. diameter runner) to be installed at the Yacyreta Hydroelectric Plant, which is at present being built jointly by Argentina and Paraguay.



Furthermore, IMPSA shall provide, together with the Argentine Group and Energomachexport V.O. (U.S.S.R.), four 360 MW Francis turbines for the Piedra del Aguila Plant (Argentina), built for Hidronor S.A.

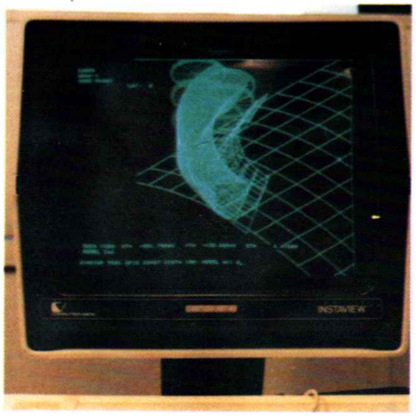
ENGINEERING KNOW-HOW

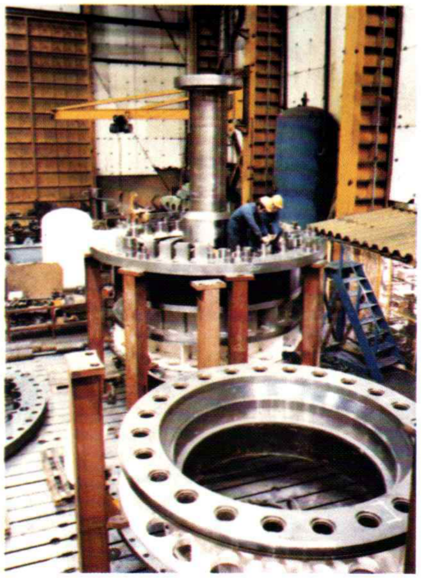
All water flow conditions are different, so there is a wide range of outputs and speeds. That is why these machines have to be custom designed and built to meet their specific requirements.

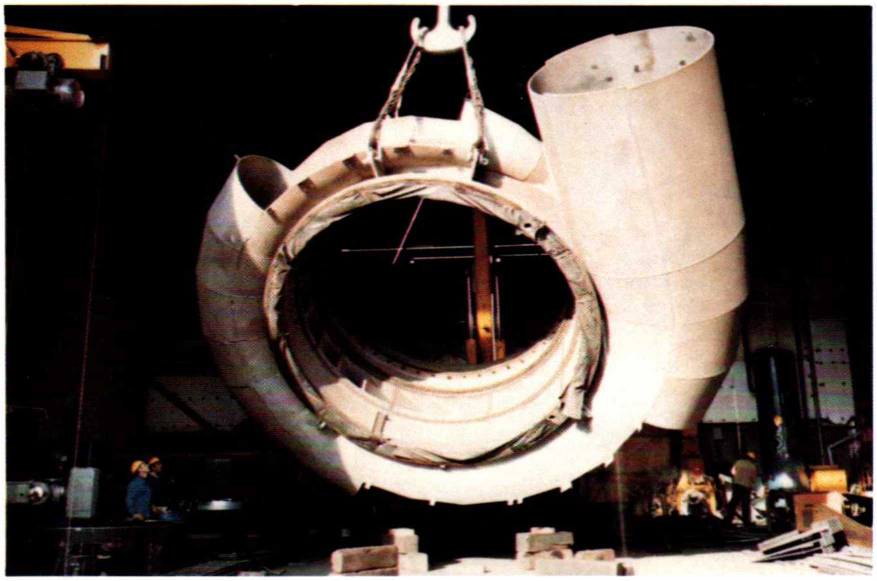
IMPSA's highly capable professionals and technicians, solid in-house engineering, constantly updated, with the most sophisticated technological advances, and support from licensors, leaders in this field, such as KVAERNER BRUG, NOHAB, ESCHER WYSS, VEVEY, etc. provide assurance that the proper facilities, correctly designed, will be furnished.

ADVANCED INTEGRAL COMPUTER APPLICATIONS

The Company makes wide use of its sophisticated computers through systems such as CAD/CAM (Computer Aided Design/Computer Aided Manufacturing) which allow data generated during design to be used to program production equipment and







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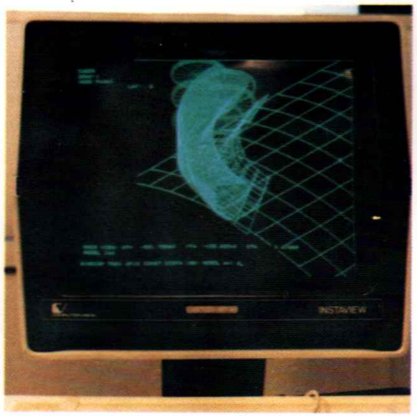
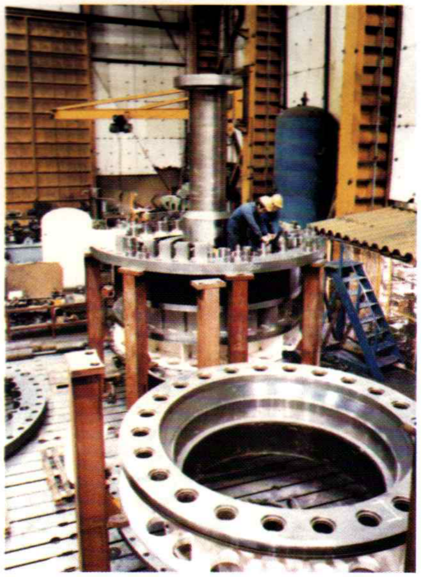




through special programs such as NASTRAN, STRUDL, etc.

The tool path for complex machined parts is analyzed prior to machining using computers where the tool movements are simulated on the terminal's screen.

To select the very best equipment to meet the customer needs, IMPSA has computer programs that make it possible to study various alternatives.

QUALITY ASSURANCE

The Quality Assurance Department has the resources in both personnel and equipment to assure rigorous compliance with the strictest specifications and standards.

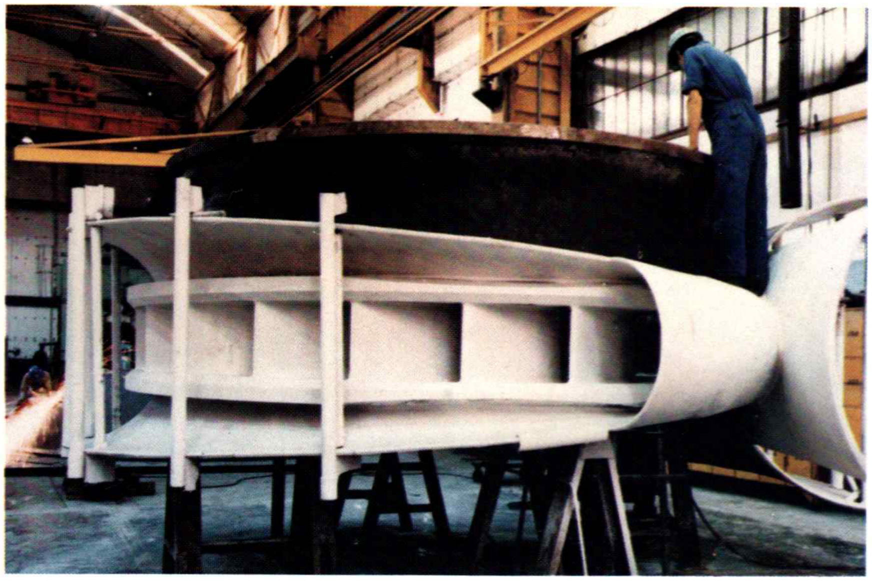
MODERN PLANTS AND EQUIPMENT

IMPSA has two main plants designed and equipped to produce capital goods, covering an area of 26,000 m.^{2} with an additional 56,000 m.^{2} of open yard for erection and storage. There are also smaller satellite plants to manufacture components such as autoparts and gears.

The equipment installed includes large precision machine tools, machining centers, bending rolls, presses, welding columns and positioners, stress relief and heat treatment furnaces, plate cutting equipment, etc., many of which are numerically controlled.

The advances made in numerical control programming have made it possible to machine medium and large Kaplan blades as well as any turbine component that requires complex precision machining.

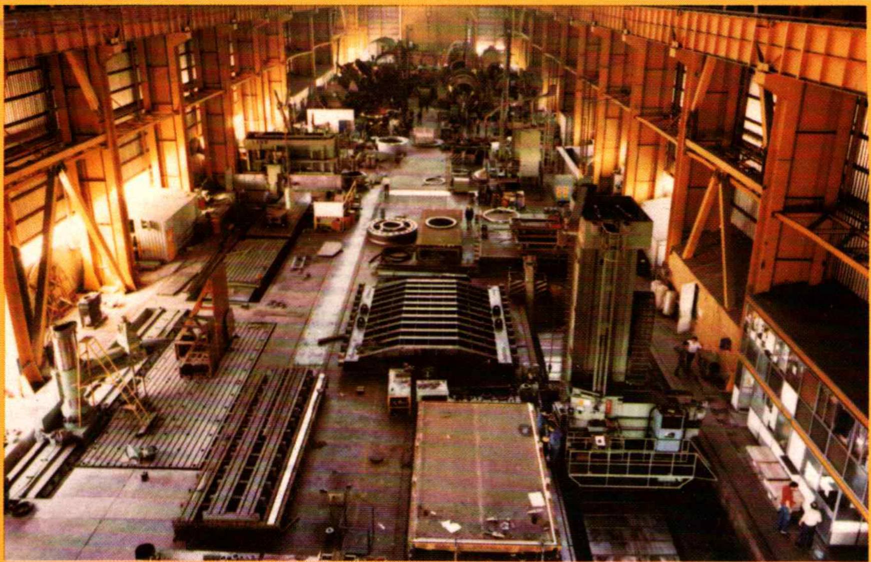
IMPSA HAS THE NECESSARY TECHNOLOGY AND EQUIPMENT AND CAN MEET WITH A COST ADVANTAGE THE REQUIREMENTS OF THE MOST EXACTING HYDRAULIC TURBINE PROJECTS WITH THE HIGHEST LEVEL OF EFFICIENCY AND QUALITY.



SOME REFERENCES

YEAR	PROJECT	COUNTRY	QTY	TYPE	NOMINAL OUTPUT (MW)	NOMINAL HEAD (METERS)	SPEED (RPM)	RUNNER DIA. (METERS)
1979	Arroyito	Argentina	3	Kaplan	42.5	15.9	91	6.2
1980	Las Maderas	Argentina	2	Francis	15.7	113.5	375	1.7
1981	Jaguas	Colombia	2	Francis	96.0	245.4	400	2.6
1982	Ullum	Argentina	1	Kaplan	42.3	44.0	177	3.9
1983	El Tigre	Argentina	2	Kaplan	5.9	21.5	300	2.4
1984	Asturias	Nicaragua	4	Mixed Flow Pump	1.2	29.5	590	1.0
1984	Urugua-I	Argentina	2	Francis	60.0	86.5	250	2.8
1984	Casa de Piedra	Argentina	2	Francis	31.0	38.0	158	3.4
1984	Piedras Moras	Argentina	1	Kaplan	6.5	23.5	250	2.4
1985	Yacyreta	Argentina/ Paraguay	7	Kaplan	138.0	21.3	71	9.5
1985	Piedra Del Aguila	Argentina	2	Francis	356.0	108.0	125	6.1
1986	KAW	Oklahoma U.S.A.	1	Kaplan	33.7	24.0	138	4.6
*1987	Tunnel No. 1	Oregon U.S.A.	1	Kaplan	8.5	22.0	257	2.5

- **TURNKEY PLANTS**
- **NUCLEAR ENERGY**
- **HYDROMECHANICAL EQUIPMENT**
- **HYDRAULIC TURBINES AND GENERATORS**
- **STEEL MILL EQUIPMENT**
- **PROCESS EQUIPMENT AND PRESSURE VESSELS**
- **BRIDGE, GANTRY AND PORT CRANES**
- **AUTOPARTS**
- **SPECIAL PROJECTS**
- **STEEL STRUCTURES**
- **CIVIL WORKS**
- **COMPONENTS FOR THE AERONAUTICAL INDUSTRY**
- **LARGE PUMPS**



HONG KONG OFFICE:
IMPSA ASIA
Suite 501, 5/F.,
Exchange Square Tower II,
8, Connaught Place,
Central, Hong Kong.
Tel: 5-8104266/7
Tlx: 83384 IMPSA HX
Telefax: 5-8100562

IMPSA – INDUSTRIAS METALURGICAS PESCARMONA S.A.
Viamonte 1526 – 5° Piso – (1055) Buenos Aires – Argentina
Ceretti 244 – (5501) Godoy Cruz – Mendoza – Argentina
TEL.: Mendoza: 228000 – TLX: (33) 55108/55315 – IMPSA – AR
TEL.: Buenos Aires: 45-5044/3326/3602 – 49/8385
TLX.: (33) 17971/22432 – IMPSA – AR

IMPSA INTERNATIONAL INC.
Manor Oak II, Suite 536
Pittsburgh, PA 15220
TEL.: (412) 344-7003
TLX.: (710) 664-2025 –
IMPSA – PGH
AT&T FAX: (412) 344-7009

IMPSA ANDINA
Av. 40 – AN° 13-09
Edificio UG1, Of. 11-04
Bogota – Colombia
TEL.: 285-5259
TLX.: (396) 42011 – IMPSA CO